CLAIMS

What is claimed is:

1. An apparatus comprising:

a first pull-up structure;

a pull-down structure; and

a comparator, coupled to the first pull-up structure and the pull-down structure, to calibrate the first pull-up structure and the pull-down structure against a reference impedance.

2. The apparatus of claim 1, further comprising a second pull-up structure coupled to the comparator.

3. The apparatus of claim 2, wherein the comparator is operable to calibrate the second pull-up structure against the reference impedance.

4. The apparatus of claim 3, further comprising a first, a second, and a third registers coupled to the first and the second pull-up structures and the pull-down structure, respectively, to store a plurality of input values to a plurality of output drivers.

5. The apparatus of claim 4, further comprising a first, a second, and a third counters coupling the comparator to the first, the second, and the third registers, respectively, to

write the plurality of input values into the first, the second, and the third registers in response to an output of the comparator.

6. The apparatus of claim 5, further comprising a switch to electrically couple the output of the comparator to one of the first, the second, and the third counters.

7. The apparatus of claim 2, wherein the first and the second pull-up structures are shorted together.

8. The apparatus of claim 2, wherein the first and the second pull-up structures are substantially identical.

9. The apparatus of claim 1, wherein the reference impedance resides with the comparator on an integrated circuit die.

10. The apparatus of claim 1, wherein the reference impedance resides on a package substrate.

11. The apparatus of claim 1, wherein the reference impedance resides on a printed circuit board substrate.

12. The apparatus of claim 4, further comprising a plurality of transmission lines coupled to the plurality of output drivers.

13. The apparatus of claim 12, further comprising a plurality of receivers coupled to the plurality of transmission lines.

14. The apparatus of claim 4, wherein each of the plurality of output drivers comprises an output driver pull-up structure and an output driver pull-down structure, the output driver pull-up structure and the output driver pull-down structure being set in response to the plurality of input values.

15. The apparatus of claim 14, wherein the first pull-up structure and the pull-down structure are within a replica circuit, the output driver pull-up structure is substantially identical to the first pull-up structure in the replica circuit and the output driver pull-down structure is substantially identical to the pull-down structure in the replica circuit.

16. The apparatus of claim 14, wherein the first pull-up structure and the pull-down structure are within a replica circuit, an impedance of the output driver pull-up structure is related to an impedance of the first pull-up structure within the replica circuit by a first predetermined ratio, and an impedance of the output driver pull-down structure is related to an impedance of the pull-down structure within the replica circuit by a second predetermined ratio.

17. A method to control an impedance of an output driver, the method comprising:

calibrating a first pull-up structure with a comparator against a reference impedance; and

calibrating a pull-down structure with the comparator against a network including the reference impedance.

18. The method of claim 17, wherein calibrating the pull-down structure comprises enabling the first pull-up structure and a second pull-up structure.

19. The method of claim 18, further comprising calibrating the second pull-up structure with the comparator against the reference impedance.

20. The method of claim 19, further comprising electrically coupling the comparator to one of a first, a second, and a third registers.

21. The method of claim 20, further comprising writing a first, a second, and a third values into the first register, the second register, and the third register, respectively, wherein the first, the second, and the third values correspond to impedances of the first pull-up structure, the second pull-up structure, and the pull-down structure, respectively.

22. The method of claim 21, further comprising adjusting the impedance of the output driver in response to the first and the third values.

23. The method of claim 18, further comprising shorting the first pull-up structure and the second pull-up structure.

24. An apparatus comprising:

means for calibrating a first pull-up structure and a pull-down structure against a reference impedance; and

means for adjusting an impedance of each of a plurality of output drivers in response to the calibrated first pull-up structure and the calibrated pull-down structure.

25. The apparatus of claim 24, wherein the means for calibrating the first pull-up structure and the pull-down structure calibrates a second pull-up structure against the reference impedance.

26. The apparatus of claim 25, further comprising:

means for providing a plurality of input values to each of the plurality of output drivers, wherein the plurality of input values correspond to an impedance of the first pull-up structure and an impedance of the pull-down structure.